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### THE BASIN OF THE SOUTH FORK OF THE SAN JOAQUIN RIVER.

By J. N. LE CONTE.

That portion of the Sierra Nevada Range drained by the South Fork of the San Joaquin and the Middle Fork of King's River may well be called the heart of the High Sierra. Although the summit peaks do not rise to quite such an elevation as do some at the source of the Kern, still the mountains are so much more rugged, the cañons so much deeper and more numerous than in the southerly region, that the peculiarly savage type of High Sierra scenery seems to reach its culmination here.

Our information bearing on the San Joaquin Sierra is almost entirely due to Mr. Theo. S. Solomons, who visited the region during three summers, and explored nearly two-thirds of the great basin of the South Fork. His work, which is incorporated in the last edition of the Sierra Club map, is remarkably accurate, considering the extent of the country covered and the few instruments at his disposal. By referring to the map, it will be seen that the South Fork of the San Joaquin River heads at Mt. Goddard and flows north-west nearly parallel to the main crest for a distance of forty miles, where it joins with the Middle Fork, makes an abrupt turn to the west, and

flows through a deep transverse cañon to the California plain. This stream is fed by four main tributaries from the east. The first and largest is Mono Creek, which enters about twelve miles above the junction of the principal forks, and drains the crest from the Red Slate group to Mt. Abbott. The second, Bear Creek, joins the South Fork five miles above. Ten miles farther the North Branch enters through a very deep cañon and drains a vast area about the foot of Mt. Humphreys. And last is the Middle Branch, heading back to the Goddard Divide. South of this divide are the sources of the Middle Fork of King's River. This region is the roughest and most inaccessible in the whole range, and has not as yet been mapped, even in the most general way.

It was my good fortune last spring to be able to make arrangements with Mr. C. L. Cory for an extended trip through the upper San Joaquin country, with particular reference to the unmapped region about Mt. Humphreys. Our plan was to follow the South Fork to its source, making side excursions to the main crest by way of the large tributaries, and thus run a rough chain of triangulation between the highest peaks from Mt. Ritter to Mt. Whitney. If time permitted, we hoped to push across the King's River basin, and thus make that magnificent and wild cross-country trip from Yosemite to the King's River Cañon.

The start was made from Wawona, on June 16th. As we did not expect to be able to replenish our stock of provisions during the next six weeks, we took two pack-animals with us. We entered the mountains by the same route as that followed by Mr. Solomons,\* namely, over the

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\* See Publications of the Sierra Club, Vol. I., p. 221. "A Search for a High Mountain Route from the Yosemite to the King's River Cañon." Theo. S. Solomons.

Mammoth Trail to the Jackass Meadows, across the Middle Fork of the San Joaquin at Miller's sheep-bridge, and thence by the Miller and Lux trail to its crossing at Mono Creek. The trail up to this point runs through the forest belt of the Middle Sierra, and it was covered without difficulty by noon of June 21st. Here we left the main trail and started up the creek to make our first acquaintance with the summits. Throughout its lower course Mono Creek flows through a wide, level valley covered with reddish sandy soil and a sparse growth of timber. Higher up it comes down through a magnificent cañon, whose walls rise to a height of 2,000 feet above the stream. The southern wall is especially fine, and at intervals side-gorges break through it, forming deep recesses, about whose heads are the snowy summits of the Abbott group, nearly 14,000 feet in elevation. A rough trail led up the left bank, and scarcity of feed for our animals drove us far up the cañon, nearly to the fourth recess, before we camped, at 7:30 P. M., at an elevation of 9,100 feet.

The Abbott group appeared the most inviting, but we wished, if possible, to get a station nearer Mt. Ritter; so we decided on Red Slate Peak for our first climb. By five the next morning we were off with camera, plane-table, and lunch, and took our way up the first stream entering Mono Creek from the north. After a couple of hours' steady climbing, we came in sight of a splendid jagged peak, which appeared to be the one we were seeking. In order to reach its base, we were obliged to climb out upon the main crest of the range at an elevation of 11,500 feet. From this point we saw that Red Slate Peak was far beyond, and that the nearer one was evidently that called Red-and-White Peak on the map. This latter, though not so high as Red Slate, is a far more imposing object; but it appeared to be entirely inaccessible from the south. So it

was without any great feelings of regret that we turned our attention to the more distant mountain. We were now forced to descend the eastern slope of the range for nearly 2,000 feet into a deep cañon, most of the way lying over hard-frozen snow-fields. Once at the bottom, it was an easy matter to skirt the southern spurs of Red-and-White Peak and make our way into a snow-filled cañon that led up to the Red Slate. We crossed long stretches of snow, around the margin of several frozen lakes, and at last reached the foot of the mountain and started up its southern flank. From this point the ascent is quite easy, although the jagged fragments of slate are even more trying to the patience than to the shoes. We reached the top by noon, after seven hours' steady climbing. There was no monument or sign of any sort to show that an ascent had ever been made before.

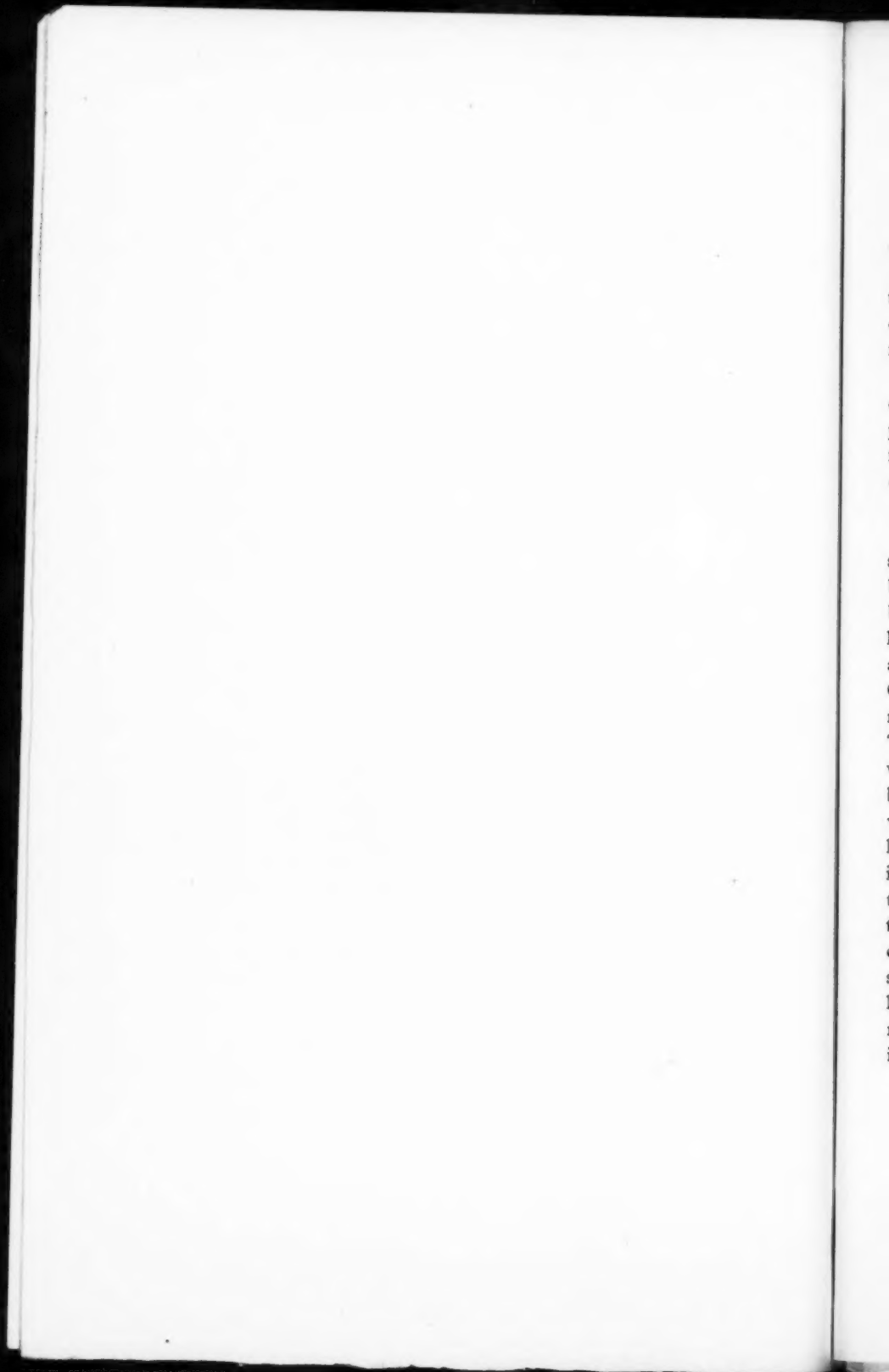
The view from the summit is one of the very finest that the High Sierra affords, and was the most truly Alpine we saw during the whole trip. Toward the north the crest retains its rugged character for a distance of ten miles only, beyond which it breaks down in the neighborhood of the Mammoth Pass. But to the south the mountains were piled up in indescribable confusion, over an unnamed and almost unknown wilderness. Rising above the sweeping snow-fields were a few giants of the range which we were able to recognize — Mt. Abbott and Mt. Gabb,\* at the head of the Mono Creek recesses; the Seven Gables, on Bear Creek; still farther to the south, the spiry summit of Mt. Humphreys; and farthest of all, old Mt. Goddard, which lifted its head high above its neighbors. To the west was

\* These two peaks were named by Prof. Wm. H. Brewer and party, of the California Geological Survey in 1864. On account, however, of the indefinite way in which they were located upon the map of Central California, they have never since been, and probably never will be, identified. On the new Sierra Club map (1899) these names will be given to the two most prominent points in the immediate vicinity.





RED-AND-WHITE PEAK.  
From a photograph by J. N. Le Conte.



the great basin of Fish Creek, and close by the pinnacles of the Red-and-White group; while far to the north we could recognize our old friends of the Yosemite region — Lyell, Ritter, Dana, and Conness. By noon the sky was thickly overcast, and a cold wind made it very difficult to do any map-work; but by 1:30 P. M. we had succeeded fairly well and started down.

At five in the evening we reached camp, only to find to our dismay that one of our pack-animals was dead — probably poisoned by eating laurel. This accident cost us four days' delay, during which time we lived with a party of hospitable sheep-men till we could replace our jack, "Dewey," with a rare mule, "Dynamite."

The loss of time prevented an attempt at Mt. Abbott, so we started out again on June 27th, crossed the divide between Mono and Bear Creeks, and descended by a terribly rough route, and without a trail, into the cañon of the latter. Once in the bottom, there was no more trouble, and we made our way up the cañon to the foot of the Seven Gables, camping a second time at 9,100 feet. On the morning of the 29th, the Seven Gables was ascended. Though over 13,000 feet in elevation, the ascent is made without the slightest difficulty; in fact, we reached the top by 8:45 A. M. Now for the first time we obtained a clear view of Mt. Humphreys, about nine miles away in an air-line. One glance at it showed that its summit was difficult, if not impossible, of access. We could see that this mountain formed the culminating point of a long knife-edge on the main crest. The western side was a sheer precipice for certainly 1,000 feet; and with our knowledge of the eastern slopes of High Sierra peaks, we knew that that side was at least as bad, if not worse. So there was only one possible route to the summit, and that was along the knife-edge itself, although it was gashed down in many places by deep

clefts. Furthermore, the region to the west of it was one of peculiar ruggedness, and it seemed as though we could not get our animals within a day's march of the mountain from any direction. The day was a perfect one, and we remained on the summit for hours, gazing at the wonderful panorama. By four o'clock we started down, and returned to "Mosquito Camp" all too soon.

During the next two days we made our way back to Mono Creek, and again took the Miller and Lux trail up the South Fork of the San Joaquin to Lost Valley or the Blaney Meadows. This is a Yosemite-like valley about four miles below the junction of the North Branch and the South Fork, and here is located the main camp of the sheep-men, whose range extends over the whole region drained by the upper South Fork. At a fine hot spring we found the camp, and in the evening one of the pack-trains came in. From the packer we learned that the cañon of the North Branch was utterly impassable for animals, but that it might be possible to reach Mt. Humphreys by keeping on the high ridges to the north of the cañon. So, at noon of July 2d, we climbed 3,000 feet out of the South Fork Cañon, and camped at an elevation of 10,550 feet, just below the top of the ridge. A magnificent panorama was now spread out before us. We were in the angle between the tremendous cañons of the Main South Fork and the North Branch, each 3,000 feet deep. The former, in a perfect maze of tributary gorges, headed back to Mt. Goddard and the wilderness of peaks to the east of it. The latter was directly beneath us, but the bottom of the cañon could not be seen, as the summits of the northern wall rose so high as to be projected against the southern, which rose precipice upon precipice far above us into the region of snow. Farther up we could see the silvery thread of the stream. The whole course of the cañon could be followed to the point

where it forked into two almost equal branches encircling Mt. Humphreys. The last of the sunset rays shone upon this great mountain, rising like a golden spire out of the deep shadow. Even at a distance of ten miles its great height could be appreciated, for not a peak within a radius of eight miles even approached it in altitude.

It is needless to relate the experiences of the next two days, for they consisted of nothing more than a series of fruitless attempts to get eastward across a plateau scored with deep transverse cañons. So we returned to the hot-spring camp in despair, and decided to abandon the attempt of getting our pack-animals any nearer.

So, early on the morning of July 6th, we packed our knapsacks with food for three days, took a light feather quilt apiece, the plane-table, aneroid, and Sierra Club register-box, but left behind from force of necessity the camera. Thus equipped, we took our way up the South Fork cañon as far as the North Branch, crossed this latter on a log bridge, and started up its cañon. Any one who has traveled one of these great cañons without a trail will understand what the work of the next three hours was like. It was breaking through thick brush, climbing over or between huge boulders of the talus slope, or scaling rocky promontories which projected into the stream. By 10 A. M. we reached the forks of the river, and found the traveling easier as we took our way up the south tributary. Finally we climbed out of the cañon by its north side, and made our way over a desolate moraine-strewn plateau to the last storm-beaten tree, where we threw down our packs for a camp at an elevation of 11,000 feet, at the very foot of Mt. Humphreys.

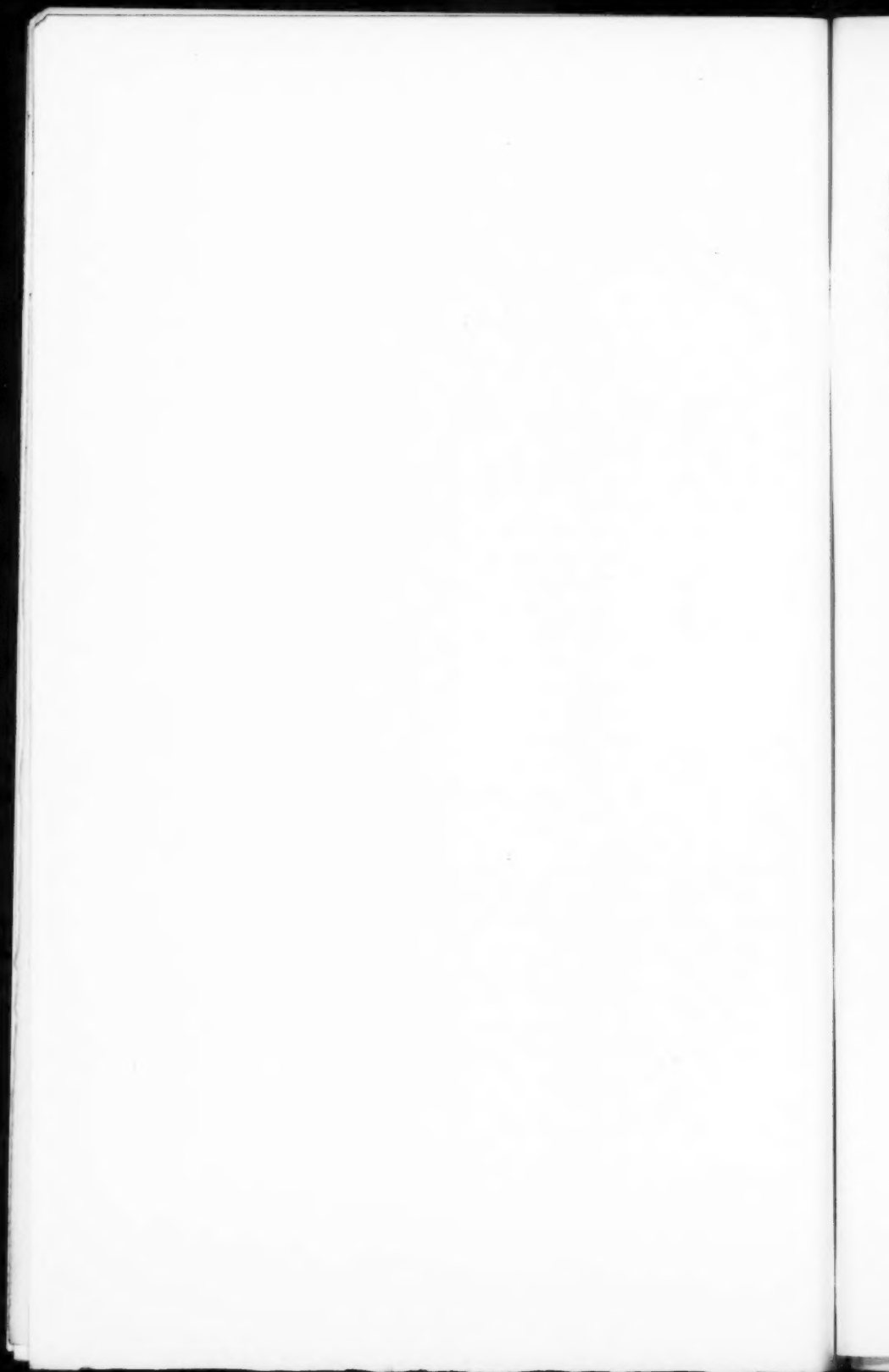
It would be impossible to describe our feelings as we stood at last in the presence of this great mountain, so utterly different from any other in the Sierra. It stood

alone, a solitary pinnacle of rock, rising 3,000 feet above a wide, desolate plain. Not a tree nor a vestige of vegetation was in sight, nor was there even a trimming of snow to relieve its savageness of aspect. The western side appeared to be a sheer precipice for 1,500 feet. That the whole ridge was a knife-edge we could tell by the myriad of tiny fringing columns projected against the sky. On the north the rocks fell in a clear sweep 500 feet from the summit to the knife-edge, and in the other direction, after a gradual slope for a short distance, there was another break of 1,000 feet to the southern knife-edge. The eastern side we could not see, but there could be no doubt that it also was a precipice. At first there seemed to be no possible way of getting to the top. We sat for hours in silence, gazing at the mighty shaft, and as the sun sank behind us we watched the shadows creep amongst the crags. Then we became aware of a gorge up the southern wall, which the shadows threw into relief; but even with the aid of our telescope, it seemed a hopeless task to ascend it.

By five next morning we set out across the wilderness of old moraines toward the mountain. Soon the sun rose, but its warmth did not reach us, for the mountain cast its shadow far out over the plateau; but golden streamers of light crowned the summit like a glorious aureole. We reached the foot of the *débris pile* in a couple of hours. It was not over 500 feet high, and soon we were upon the rocky front. We made our way without great difficulty up a rugged gorge to the crest of the southern knife-edge, where the warm sunlight poured in through a cleft in the ragged wall. From here we could see the awful precipice on the eastern side, a granite wall 2,000 feet high, as smooth as the face of El Capitan. Our ridge rose in a vertical edge for hundreds of feet, offering not a single foot-



MONO CREEK CANYON.  
From a photograph by J. N. Le Conte.





hold. So after basking a while in the sunshine, we made our way to the little gully which had been seen from below. This ran transversely up the western face, and our hopes rose when we approached it, as the way seemed clear for several hundred feet. But these hopes were of short duration, for we soon encountered steep slopes covered with clear ice, which could not be ascended without either rope or ice-ax. I think a climber, properly equipped, might easily pass this place; and perhaps early in the season, when the gorge is filled with snow, one might ascend by its aid. But whether this would eventually lead to the summit is by no means certain. The little gorge crossed the main ridge, and seemed to run out into nothing on the face of the great eastern precipice. After pushing even beyond what seemed safe, we descended to the foot of the western cliff, and cautiously worked our way around its base, thus finally gaining the top of the northern knife-edge at the point where the summit rises vertically above it. No one could possibly ascend the mountain from this side, and we could again see the eastern wall. So we climbed along the crest northerly to the top of a little pinnacle, and lay down in full view of the summit, which looked down upon and defied us. What would we not have given for our camera at that moment! If it had only been possible to bring away a photograph—a suggestion of that wonderful sight, that spire of granite over five hundred feet high, not two hundred feet wide where we stood, and whose sides continued on a thousand feet below! I have never felt so impressed, so utterly overpowered, by the presence of a great mountain as when standing amongst the crags of Mt. Humphreys looking up that smooth wall to its airy summit, and again down ten thousand feet into the depths of the Owen's Valley.

We built a monument where we stood and deposited

therein the Sierra Club register-box, which I trust will some day be taken on to the summit. The aneroid read 13,550 feet, and on careful comparison on return to camp of the height still remaining with that already covered, we judged that the mountain was a trifle over 14,000 feet.\* This is probably very nearly correct, as Mt. Humphreys overtops everything north of the Palisades. The descent to the talus was slow but not difficult, and camp was reached by one o'clock. After lunch we shouldered our knapsacks and went down as far as the forks of the stream, camping for the night at the more reasonable elevation of 9,300 feet.

By ten o'clock next morning we returned to the hot spring. During the morning it rained hard, but cleared off in the night; and finding the weather fairly settled by noon, we started with our outfit up the cañon of the South Fork on July 8th. The trail was rather obscure, though not very rough, and the cañon was truly magnificent. The west side was a fine rocky wall for a distance of many miles, over which the tributaries from that direction plunged in a succession of cataracts. By evening our trail crossed the river, and we camped in a grassy flat on the further side, near the junction of the Middle Branch. This last large tributary enters between two bold, rocky buttresses, and forms a fall of considerable height. Its cañon looked inviting, but we had already wasted too much time in the North Branch country, and so pushed on up the main stream, reaching the base of Mt. Goddard by noon of the 10th.

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\* There is no doubt that the mountain we attempted is the true Mt. Humphreys. The location of the mountain as given by our triangulation from Mt. Ritter checks closely with that given by the California Geological Survey when their map of Central California is corrected for a slight error in longitude, and is within 250 yards of the position given by Capt. Wheeler in his "Surveys West of the 100th Meridian." There is no mountain of equal height nearer than Mt. Darwin, eight miles south. On our return to the hot spring, we learned that three different parties from Owen's Valley had attempted the ascent before, but had failed.

The South Fork of the San Joaquin heads in a wide, grassy valley, very much like the upper Tuolumne meadows, but hemmed in on both sides by snowy ranges of mountains. One can ride a horse without the slightest difficulty quite to the foot of Mt. Goddard; but there his journey must end, for there is no possible way of taking animals across the Goddard Divide, or, even if it could be crossed, of descending the rocky gorges leading down to the King's River below.

We camped near the timber-line and rested in the afternoon while watching the cirrus clouds drifting about. In the morning the whole sky was heavily overcast, but we had decided to wait no longer for this uncertain High Sierra weather, and so made our way across the intervening meadow-land to the foot of the mountain. The ascent of Mt. Goddard is accomplished without the least difficulty. It is very much such a climb as Mt. Dana affords, for the whole mountain is covered with loose fragments of slate. The view from the summit is unquestionably the most extensive to be found in the High Sierra. Every prominent point of the crest can be seen from Mt. Conness to Mt. Whitney, a distance of one hundred and twelve miles in an air-line. That portion of the crest from Mt. Humphreys to the Palisades is especially fine, all the higher peaks about the latter averaging over 14,000 feet. The upper tributaries of the King's River flow in deep parallel gorges, separated by high, jagged divides. The cañons of Goddard and Disappearing Creeks are amongst the deepest, descending over 8,000 feet in a comparatively few miles. The aneroid reading on Mt. Goddard was 13,500 feet.

From this point we could clearly see that our route to the south was blocked, unless we should abandon our outfit and proceed on foot. We had been told on several occasions of a certain Baird trail, which crossed from the San

Joaquin over to the North Fork of the King's at some point to the north-west of Goddard. From our elevated position we were sure we could see the point at which it crossed the high divide, and after some hesitation decided to make an attempt to follow it. So we took careful note of the intervening country, trying to impress on our memories the prominent landmarks, till, warned by the gathering thunderstorm, we were obliged to pack up our things and return to camp about noon. The following morning found us on the march by five o'clock. We retraced our steps a mile or so down the South Fork to the point where North Goddard Creek enters it. Here a wide bench runs diagonally up the west wall of the cañon, and, as we had hoped, we found the remnants of an old trail. This we followed carefully for nearly two miles; but in spite of all our efforts, we lost all trace of it in a wide meadow some thousand feet above the river cañon. We would not retreat, however, till every attempt to cross the divide had failed, and so decided to push on without a trail. The gap at the head of the meadow was evidently impassable. The next one to the north proved to be even worse; but after two or three hours' scrambling over the ridges to the south we finally came upon a pass to the north of Red Mountain that seemed a little better. I climbed to the crest of the divide to pick out a possible way, but found no sign of a trail, and the pass was fearfully rough. It seemed a great risk to take our animals up; but the great basin of the North Fork of King's River, dotted with lakes and meadows, looked so inviting that I marked out the best way with "monuments" and returned to the packs. My companion reported that a lower pass was to the south of Red Mountain, but as the one ahead was at least passable, we decided to try it. Every Sierra climber who departs from the beaten paths will understand what the experience of the

next few hours was; so I will not describe the process of building trails across talus-slopes nor of boosting mules up steep slopes of sand. But we finally reached the top without serious accident, and, thinking our troubles over, tied our four-footed companions in misery to a couple of boulders, while we ascended Red Mountain to get a better view of the country to the south. But we little knew what was ahead; for the descent to the lake basin below was even worse than the climb. It was nearly three o'clock before we finally pulled up upon the shore of a little lake, after ten hours of the hardest work of our trip. We rested at the lake the remainder of the day, and next morning started across the basin of the North Fork of King's River. There was no trail, of course, and the route was very rough, but by the best sort of luck we made our way down into the cañon of the North Fork, and over another high divide to the headwaters of Crown Creek, which flows into the Middle Fork of King's River at Tehipite Valley. This stream was followed without difficulty, till late in the evening we ran across a well-marked trail.

There was no more trouble after this. On the morning of July 14th we followed the trail to Collins's Meadow, and from there descended into the Tehipite Valley. The wonders of this magnificent cañon have seldom been exaggerated. The only real exception seems to me to be in the estimated height of the great dome, which is certainly not over 3,000 feet, probably a little less,—far different from 5,200 feet, as sometimes claimed. In the cañon we found some campers, with whom we traveled for the next two days over that most villainous of trails up the river cañon to Simpson Meadow. Here we left them and took the Granite Basin trail over the great divide between the main forks of the King's River. From our camp in Copper Creek basin we made a last climb to the summit of Goat

Mountain, took a farewell view out over the glorious Alps through which we had been traveling, and on the afternoon of July 19th descended by the familiar Copper Creek trail to our old stamping-grounds of the King's River Cañon.

## THE TAKING OF MT. BALFOUR.

BY CHARLES S. THOMPSON.

One hundred and eighty miles from the forty-ninth parallel, and due north of the boundary-line between Idaho and Montana, the Canadian Pacific Railway crosses the watershed that divides the Saskatchewan, flowing toward Hudson's Bay, from the Columbia, which empties into the Pacific. Howse Pass, the next possible crossing for a railway, is forty miles to the north-west. Between these passes there is an elongated, glacier-covered plateau, having its greater axis in a north-westerly and south-easterly direction, and forming the central of five parallel mountain ranges which here collectively form the Canadian Rockies. Among the numerous snow-covered peaks which rise from this central plateau, the highest, with possibly one exception, is Mt. Balfour.

We passed a leisurely Friday, the 13th of August, upon a bit of dry ground between river and marsh, about twelve miles from the railway up the Bow Valley. This valley, now under one name, now under another, as open meadow, as forest, as a wilderness of wash and boulders, extends in unbroken continuity to the head-waters of the Athabasca and the Arctic watershed. As the afternoon shadow of the precipitous escarpment which upholds the Balfour snow-fields drifted nearly to our tents, we made ready for departure. The packing of our selected outfit — a Ulumery tent, two blankets, some coffee, oatmeal, bread, and some boxes of sardines — detained us little, but the cross-

ing of the ford, hissing with the melted snow and ice of six hot days delayed us vexatiously. Then as we passed northward through a spruce forest toward the Lower Bow Lake our chosen pack-horse, a cunning brute, in an incautious moment of freedom, bolted through wood and ford back to his fellow-animals. So it was dusk or later, before we camped on a small open terrace in the ribbon of rising woodland that separates the western shore of the lake from the escarpment.

At daybreak we crawled reluctantly from our toy tent to an undesired breakfast of oatmeal porridge, bread and coffee. Then leaving Edwards, our packer, to take back our outfit to the ford, we turned almost immediately from the lake and struggled upward among thickly-growing trees, through a litter of underbrush and tangled logs. It was the most fatiguing hour of the day. Suddenly—for there is no warning vista—we came upon Lake Margaret, a sapphire-colored water hidden in a re-entrant curve of the escarpment. A semicircle of grey cliffs was reflected in it. To north and south these cliffs rose apparently in one clean rock-face from forest to sky-line. The central—that is to say, the western—wall was broken by two precipices so separated that of the upper only the fore-shortened summit appeared from where we stood. Diagonally across the lower precipice was the white line of a long waterfall.

We moved along the southern shore of this lake and crossing through the alder-bushes at its head,—though not without rending of garments—began our ascent at the foot of the northern cliffs not far from the central wall. A long, steep, narrow stone slope runs up to some broken ledges that in turn lead to impassable perpendicular rock. From below nothing seems more impossible. But just as we reached the foot of the perpendicular face, some semi-





LAKE MARGARET—LOOKING TOWARD THE WESTERN WALL.  
From a photograph by C. S. Thompson.



LAKE MARGARET AND LOWER BOW LAKE—LOOKING  
EASTWARD FROM THE PARAPET.  
From a photograph by C. S. Thompson.

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continuous shelves of rock enabled us, by careful combinations, to make a mid-air traverse between precipices to the parapet that divides the central wall.

In beauty of natural coloring few scenes can surpass that which we then viewed. Below us, the dark blue of Lake Margaret, forest girt, contrasted with the opalescent green of the Lower Bow Lake, and that in turn with the spruce-filled valley and the gray eastern mountains beyond. Before us a pulpit-shaped pinnacle of limestone, iron-stained, black and reddish brown, overshadowed a lake of rare hue, a liquid turquoise set in the basin terrace of the western wall. Over its farther shore, the drab and white of a dying glacier hid in part the weather-darkened face of the upper precipice.

We crossed the tedious stone slides that lined the basin and sat down upon the glacier near a rushing streamlet for a second meal. In mountain-climbing it is well to face difficulties with a filled stomach, and a critical problem now lay before us. At the head of the glacier a broad line, crooked but continuous, declared the presence of a *berg-schrund*, or great crevasse, a deep chasm separating the top of the glacier from the rock face. These *schrunds* can often be crossed by bridges of winter snow, wind-packed or avalanche-packed therein; but here the intense heat of the preceding week, stripping the glacier to gray ice, had almost entirely destroyed them. At one point far up its southern edge, a narrow veneer, preserved by the shadow of a neighboring turret, bridged the forbidding line in a disheartening manner. Nor did its appearance improve as we ascended. But at the pinch, strategy\* prevailed and we

\* As I have written, the glacier did not quite cover the second precipice. At the foot of the turret, a ravine, perhaps two hundred yards wide, made a cross section of both glacier and *schrund*. In the upper section of the *schrund* there was wedged some snow quite as soft and thin as the bridge upon the surface. But on so steep a slope, the angle at which our weight fell upon the snow was exceedingly favorable. It was the difference between breaking an egg by pressure upon its sides or upon both ends.

crossed, cautiously it is true, to the summit of the escarpment.

We entered a different world, a rolling Arctic plain dazzling in its brilliancy, sloping gradually from south to north. At the farther edge of this plain a palisade, partially ice-submerged, rose at first gradually, then suddenly into a beautiful snow peak completely glacier-clad. This was Mt. Balfour.

It was clear that we must somehow get upon the palisade,—that is, upon the southeastern ridge, or *arête*,—and follow it, come what might, to the summit. Three openings were possible. Between us and the mountain, following the foot of the palisade, the converging glaciers of peak and plain had worn a trench or moat filled with crevasse-shattered ice. From the moat two tongues of snow, suspiciously gashed, ran upward to notches in the *arête*. Neither route was attractive. Of the two the more northerly was longer, more distant, and more broken. The southern end of the palisade, surmounted by pinnacles grotesquely human, dropped its sky-line into a wave of snow. We determined to cross at this point in an attempt to gain the ridge from the other side. If the wave ended in a precipice, we could retreat down the trench to the shorter snow tongue.

We moved in a south-westerly direction, following the circumference of a circle whose center was Mt. Balfour. It was a pleasant, easy walk, at first over almost level ice, then over snow more and more inclined. The air was comfortably cool and clearer of smoky haze than on any day that week. The uncertainty gave the needed excitement. Near the top of the wave another *schrund* pushed us under the end of the palisade, then a sudden turn and we were upon the sharp-cut crest, looking westward into British Columbia. Fifty feet below, the snow changed into a



MT. BALFOUR.

From a photograph by C. S. Thompson.



rough macadam that in turn disappeared beneath another ice-field. A glance to the north quickly assured us that this western ice-field followed our chosen *arête*, rising indeed at a distance of two miles and a half almost to its level. Half a mile beyond that point was the summit of Mt. Balfour, no nearer than when we stood a long hour before on the edge of the escarpment, but presenting, so far as we could see, no insuperable difficulties. Hitherto we had been playing for position; now our course was straight away for the goal.

The journey over the western ice-field was uninteresting—a sloppy walk over slushy snow that rose and fell in long swales, over which Balfour's summit alternately rose and disappeared. At the top of the third swale we came unexpectedly upon the edge of a precipice, a south-western spur from the main crest forming with it a  $\Lambda$ -shaped angle, into which we were forced. At the apex of this angle we came again upon the watershed, this time upon our much-desired *arête* overlooking the ice-fields of Alberta and British Columbia. Beyond the angle there was a depression in the crest, where a soft stratum of rock had decayed into a stony clay, then a sudden uplift, almost a minor peak, followed by a second depression or saddle, from which there was a steady rise at an increasing angle to the summit. The view along this ridge was most impressive.

We had gained our desire only to abandon it. Once in the depression, we chose rather to traverse the western slope of the uplift with the certainty of success than to assault it along the *arête* with the uncertainty of a descent from it into the second saddle. Our traverse was slow, partly on account of the friability of the rocks, which had in places crumbled into a coarse sand, partly because of the instability of the larger fragments thereon. It was therefore with some relief, for our day ran short, that we drew

ourselves into a breach that admitted us to the second saddle, as cozy a lunching-place as we could desire. Even cold water was not lacking. So we opened a box of sardines and ate.

From this point onward the *arête* was half ledge, half ice, like a thin cake, heavily frosted, set on edge — a very thin cake and thick frosting; for where we sat in the saddle — and this width was rarely exceeded — the ridge was but twelve feet across and half that distance ice. The line between rock and ice was at all times abruptly and continuously defined. In our advance we kept near this mediate line, upon the ice along the easier gradients, upon the rock where the increased slope required step-cutting. Nothing hindered us, and at five minutes of three we were upon the summit, a circular platform of broken stones about twenty feet in diameter, and so level that it was impossible accurately to determine the highest point.

Time goes quickly upon a mountain-top; yet even with that knowledge, I cannot account for the rapid passing of that hour. There were the usual ceremonies consequent upon such an occasion — the building of a cairn, the reading of our aneroid (11,050 ft.), and the taking of various bearings with our prismatic compass. Then we lazily stretched ourselves upon the stones, as comfortably as possible, to enjoy the view. It was different from any summit vista I had seen — unique in its impressive isolation. Surrounded by miles of glacier-swept table-land, lifted by the distant escarpment high above the valley floors, the eye swept the horizon in vain for the green of growing vegetation. Everywhere ice and snow, cut by black lines of rock, the desolation of the frozen North. Across the gap which marked the valley of the Bow, I saw, gray in the haze, the prow-like summit of Mt. Hector. With that sight there came a vision of that day when I had stood thereon gazing with



desire upon the mountain whereon I now sat. And with that vision came the words of one no longer with us, who then stood beside me: "The memory of the great snow-field, as we saw it from Mt. Hector, and of Mt. Balfour above all, is an abiding and haunting one." The taking of Mt. Balfour finished what he had planned. In success was much sorrow.

## EXPLORATION OF THE EAST CREEK AMPHITHEATER.

BY CORNELIUS BEACH BRADLEY.

A visit to the Southern Sierra had long been a cherished wish of mine, postponed, however, of necessity year by year, until its fulfillment seemed almost hopeless. But at last all obstacles were removed by an invitation to join a party of friends making their first trip in that region — Mr. and Mrs. Robert M. Price, Miss Lalla Harris, and Mr. Joseph Shinn. Leaving Niles on the morning of June 25th, we reached Sanger the same afternoon, and Millwood, at the end of the wagon-road, on the next day. Here we found our "jacks" awaiting us, and next morning, the 27th, we began our actual tramp. Three short marches brought us to King's Cañon, where we spent two days. Eleven days were spent among the various branches of Bubb's Creek. On July 11th, we struggled over the King's and Kern Divide by way of Harrison's Pass, and four days later we stood on the summit of Mt. Whitney. From this point began our homeward journey, *via* the Hockett and Jordan trails; and on the 22d we once more struck a wagon-road on the Tule River, and our 200-mile tramp was ended.

Aside from the complete change and the quickening both of body and spirit, which are the prime motives of all such expeditions, we had proposed to ourselves three definite objects of effort: the exploration of the great amphitheater at the head of the eastern arm of Bubb's Creek, the ascent of Mt. Whitney, and a reconnaissance of the upper basin





of Roaring River by way of some pass in the neighborhood of Milestone Mountain. But our time was strictly limited — too limited, as it proved, for the execution of so extended a program and for much wayside pleasuring too. Our trip was therefore a strenuous one. On eight days only out of the twenty-seven, were we not actually packed up and on the march; and five out of the eight were spent, either by some or by all of the party, in climbing or in exploring, which was quite as arduous as the marching. To say nothing of Mt. Whitney, five of the great peaks of the amphitheater at the head of Bubb's Creek were climbed, — three of them for the first time, — and a sixth, also new, was almost conquered, when a blinding thunderstorm, with hail and rain, rendered further progress too hazardous to be thought of. We had, of course, the usual experiences with animals and packs, and the inevitable perplexities about directions and trails in a region where trails are, so to speak, conspicuously obscure or altogether absent. But, thanks to the excellent management of our leaders, and thanks to the excellent foresight of our commissariat, we escaped not merely all untoward and disabling accidents, but almost everything that could really be called hardship — Harrison's Pass alone excepted. We all came through — horse, foot, and dragoons — in prime condition.

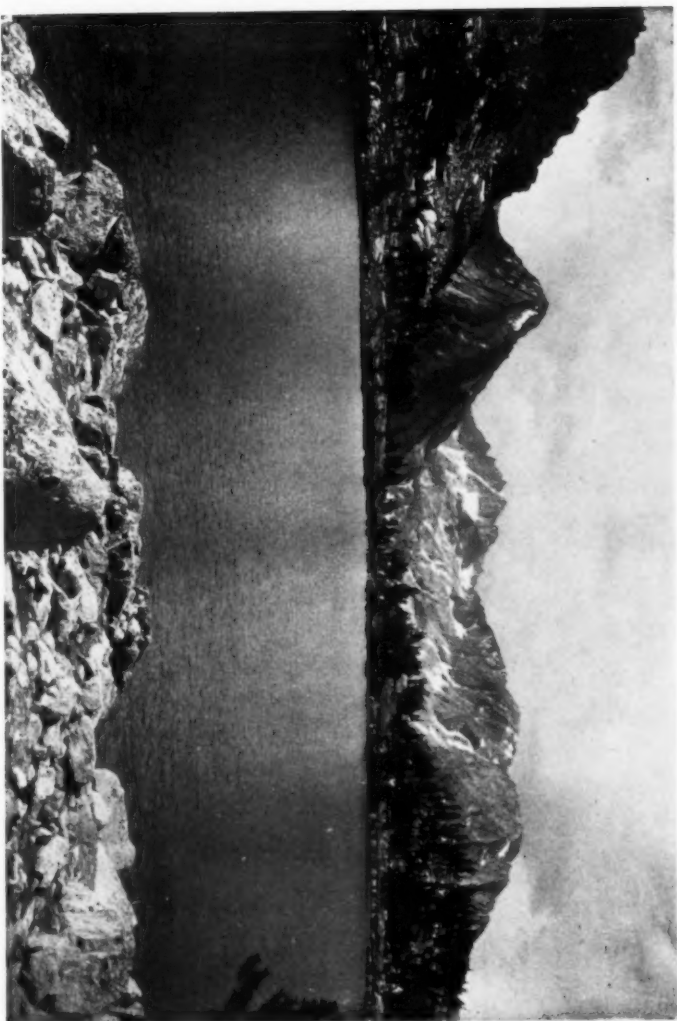
After leaving the Cañon, our first attack was upon the unexplored eastern branch of Bubb's Creek, which, for convenience of designation, it is proposed to call East Creek. Its valley is really the continuation of the main Bubb's Creek valley beyond the confluence of its south fork, or South Creek, as Professor Brown suggests that it be called. Its lower portion, as far as the junction of Kearsarge Creek, is well known, being traversed by a trail to Bullfrog Lake, intersecting there the main Kearsarge trail *via* Lake Charlotte. But beyond Kearsarge Creek there is

no record of any exploration, save that of sheep-herders. We found it an open U-shaped valley, with an unbroken rock-wall on its northern side, forming at first the jagged ridge known as the Kearsarge Pinnacles, and further on sweeping up into the great peaks of the main divide, beginning with University Peak and ending with Mt. Keith. On the southern side there is no continuous wall, but instead, a series of bold promontories, the ends of long walls or buttresses running up into the King's and Kern Divide, some miles away to the south. Two of these promontories, standing guard, as it were, the one at the entrance to the valley and the other just within it, form a striking pair, and we named them the Videttes.\* A third, standing more detached, and in the very center of the mighty cirque at the head of the valley, we named Center Peak.

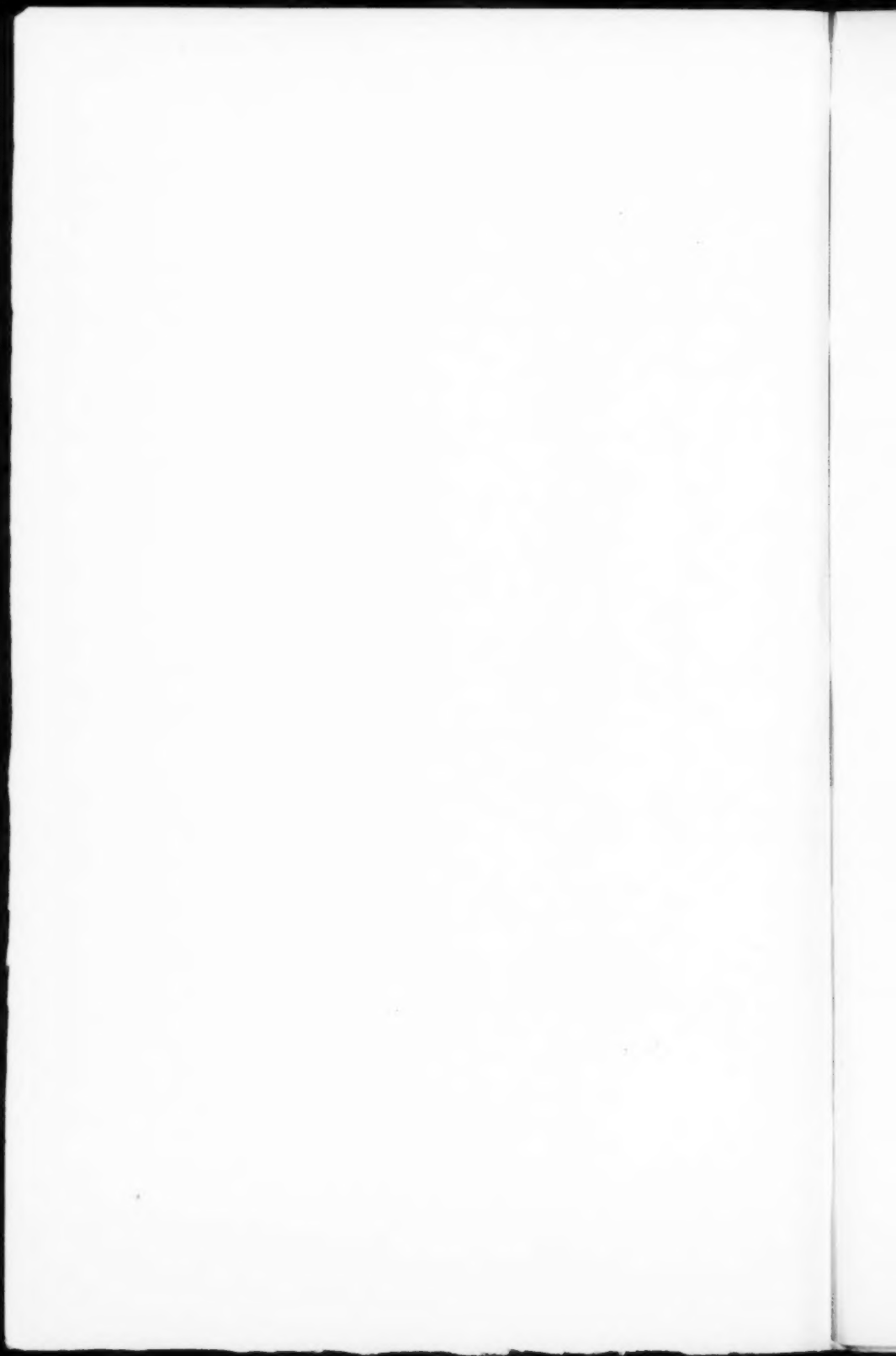
It was late in the afternoon of July 3d when we left the trail to Bullfrog Lake, and entered upon *terra incognita*. Finding good open country all along on the north side of the stream, we pushed on some two miles up the valley, and camped beside a bleak little meadow directly abreast of University Peak. Just beyond our camp was a great avalanche track, where some fifty or seventy-five years ago a great snow-field, breaking loose from its moorings far up on the slopes of the peak and plunging down the mountain-side, had swept quite across the valley and dashed part way up the slope on the other side. Its track was per-

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\* Both are finely shown in the view of Bullfrog Lake, Plate xiii. of the SIERRA CLUB BULLETIN, Vol. II., and reproduced in this number. The dark hill immediately beyond the lake on the left is the end of the Pinnacle ridge. The bold peak next to the right, but across the valley, is the East Vidette, seen end on, and to best advantage. In the extreme distance, above the center of the picture is Deerhorn Mountain, close up to the Kern Divide; and from it stretches down the long, thin ridge which ends near the right of the picture in the West Vidette, seen broadside on. Between the two runs Deerhorn Creek. The Pinnacles are shown in Plate xiii. of the BULLETIN, Vol. I., seen, of course, from the other — the northern — side. Their southern aspect, however, is very similar.



BULLFROG LAKE.  
From a photograph by J. N. Le Conte.





haps 600 yards wide, and as clean-cut as the swath of a scythe. Within it every tree was prostrated, and their rotting trunks—lying all one way on the open bottom, or heaped in a confused winrow at the very end, where the crest of the wave recoiled from the opposite slope—were eloquent witnesses to the terrific force of the avalanche. A similar track, but older and less conspicuous, we had passed perhaps a mile below. Both form striking gray bands across the valley, visible miles away from any commanding point of view.

Next morning reconnaissance was made in various directions; but a storm presently burst upon us, and the rest of the day we had to spend, for the most part, huddled together under such meager shelter as we could improvise. But the clouds broke away before sunset, and, thanks to the endless resources of the ladies, while everything was still dripping about us, we sat down to a Fourth-of-July dinner long to be remembered—with daintily cooked viands and abundant good cheer, as well as with appropriate toasts and speeches. We could not know for some three weeks yet what actually was doing at Santiago and elsewhere on that fateful Fourth, but the uncertainty only gave an added touch of pathos to the sentiments.

On the 5th we resumed our work of exploration. One of us was detailed to keep camp; three were to climb an unknown peak on the main crest, next beyond University Peak; while to me fell the easier task of climbing Center Peak and of mapping the stream which heads beyond it in Junction Peak. Both ascents were entirely successful; each party built a cairn and left therein a record of the ascent. But unfortunately I was not on hand to save the other party from the serious indiscretion of naming their peak Mt. Bradley. I protest that I had done nothing to deserve such treatment at their hands, nor had there been either

tacit consent or even contributory negligence on my part; for my views on the naming of mountains have been publicly and emphatically expressed. And, worst of all, there seems now no way to remedy the mischief, unless it be by making the ascent myself some time, and stealing the record!—a device which somehow did not occur to me at the moment.

Next day we all set out together to climb Mt. Keith, the peak next beyond the last, singled out and named some years ago, but never as yet ascended, so far as we could learn. After two hours of leisurely walk up the open valley we reached its foot, and two hours later we stood on its summit—the highest peak in all the Bubb's Creek circuit, with only Whitney, Shasta, and two or three others overtopping it in all California. The day was fine, and the view superb. All the nearer world seemed spread out like a map at our feet, while east, west, north, and south, as far as eye could reach, rolled a billowy sea of mountain peaks, streaked and tipped with snow-foam. A cairn was built, and in it was deposited one of our two Sierra Club register-boxes, with names, date, and record of this, the first ascent.

To climb Junction Peak was all that now remained to complete our conquest of this portion of the Sierra crest, and for that climb we had reserved our second register-box. But my reconnaissance of the day before, and the view still nearer at hand from the summit of Keith, had convinced us that it was not to be climbed by either of the faces in view from the north. Yet it might perhaps be climbed from the south after we had crossed the divide.

And a few days later two of us, pushing on from Harrison's Pass, did try it by way of the high quadrate mesa embraced between the arms of Tyndall Creek. But just at the farther end of the mesa, where it drops away to a splintered and crumbling knife-edge leading up to the main

peak, the thunderstorm to which reference has already been made burst upon us. So, after sheltering ourselves awhile among the rocks from the fury of the hail, we were content to clamber down again in safety, and tramp some miles in the rain to the appointed rendezvous with our friends. Meanwhile Mr. Price, remaining behind at the pass, had climbed Mt. Stanford, being the only person, so far as the record shows, to reach the cairn built by Professor Brown in 1896. All others had ventured no farther than Gregory's monument.

But to return to our camp on East Creek. Although our exploration of the valley was by no means complete, since it covered little more than the great amphitheater at its head, nevertheless it was felt that we must push on. Still University Peak was too temptingly near at hand to be left without a visit. So, while two of us broke camp and took the pack-train around by trail to Bullfrog Lake, the other three took the more direct route right over the peak, rejoining us in camp at about 6 P. M.

The rest of our trip may be more briefly dismissed. After crossing the King's and Kern Divide, it became evident that the time still remaining at our disposal would not suffice for the whole of our program. Either Mt. Whitney or Roaring River must be left out. A careful reconnaissance for some miles along the Kern River failed to reveal the promised trail or opening leading over into the Roaring River basin. We could not be sure that there was any practicable pass at all. So, considering that a bird in the hand is worth two in the bush, we decided on the Whitney trip. The return by the southern route was but the inevitable result of abandoning the Roaring River scheme.

In general, the country immediately south of the divide seemed to us much less beautiful and interesting than the Bubb's Creek basin. It was a region of vast spaces with

little in them; bleak sandy deserts, boggy moors without shrub or tree, dreary miles of moraines. Even the forests on the hillsides had a ghastly look; for the tiny, short needles of the Balfour pine cannot cover, or even soften, the nakedness of the ground. The reddish-brown trunks rise stark and stiff out of white granite rocks or sand. The Balfour pine itself, however, is a striking tree, with more variety of individual character and form, with more piquancy of carriage than almost any pine we had ever seen. Then there is a peculiarity of texture in much of the granite of this region, which causes it to weather in strange spiry and flamboyant forms, quite unlike the splintering into angular blocks along the Bubb's Creek crests. A striking example is seen in the fantastic conical spires which dot the northern roof-like slope of Mt. Tyndall. The topmost layer of all, however, as seen on the summit of Mt. Whitney, is a fine massive, enduring rock, split indeed by frost into immense blocks, but not crumbling into sand. And it is doubtless to this enduring quality of the rock that Mt. Whitney owes its pre-eminence.

The country grew more interesting again as we neared the Kern River; and from there on we were in a region populous with campers from the Inyo and San Joaquin Valleys. The upper—and larger—Kern Lake we found to be only a meadow, flooded not very long ago by a fall of rock which dammed up the river. The lake is an unsightly thing; dead trees are rotting in stagnant water, and the bed is fast filling up with silt. It will not be long before it is meadow again. On the Kern we had the only two adventures of the trip—the capture of our best fish, a five-pound river-trout, and the narrow escape of one of our party from the claws of an angry mother-bear.

The Tule River, which we struck below Nelson's (just off the southern edge of the Club map), was in its way one

of the most beautiful things we had seen. Though flowing through open foot-hill country clothed only with chaparral and scrub, the water was crystal-clear from its mountain springs, and the bed of the stream was of clean white granite rock *in situ*, sculptured into a succession of deep oblong pools; and over the smooth lip of each the water fell in charming cascades, or chutes, into the pool below — a string of emeralds on a silver chain.

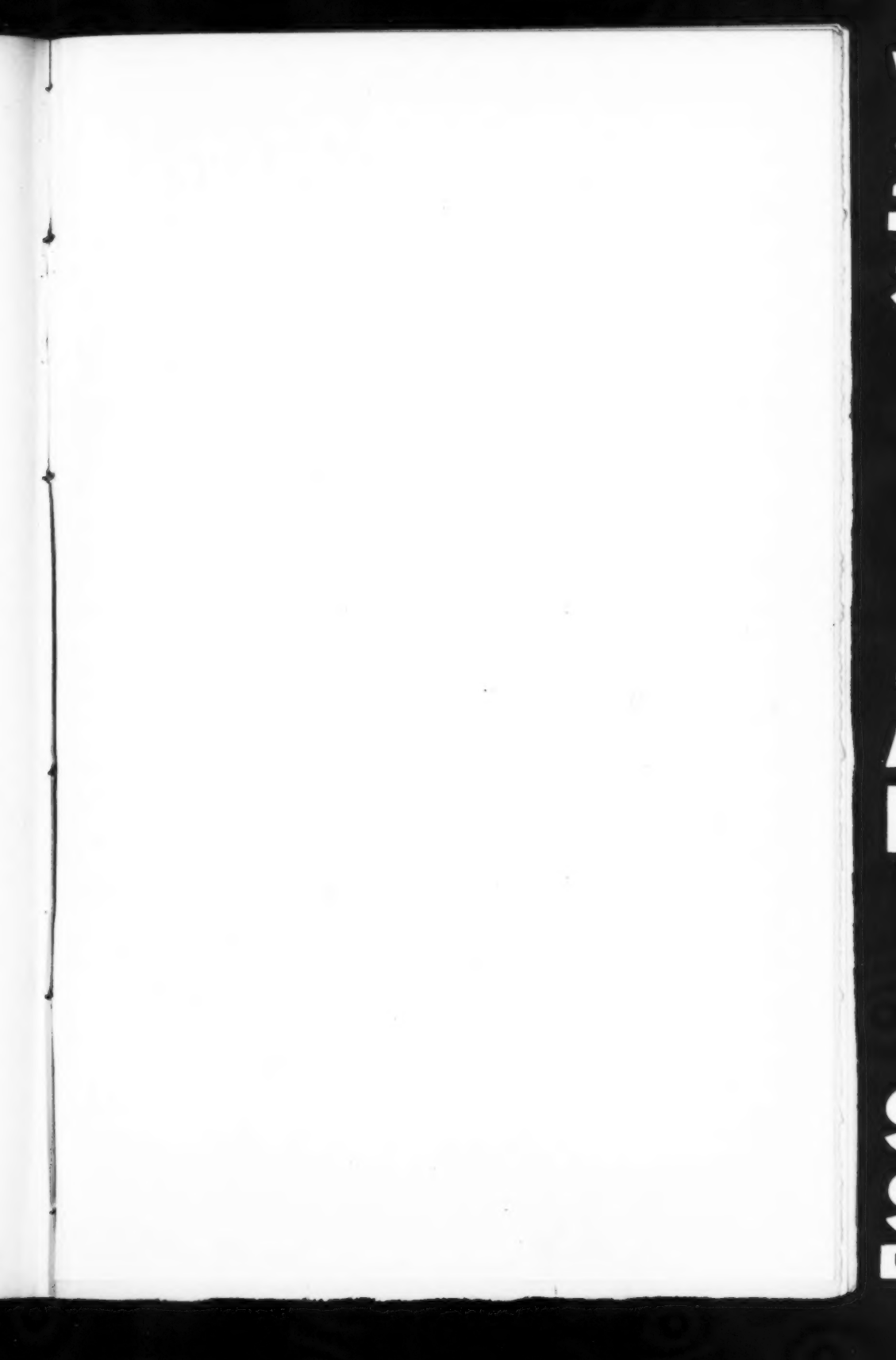
Among the many things one would like to have done on such a trip, I may mention two or three which we should still wish to do were we ever again in that region. We should like to have another chance to climb Junction Peak, and to ascertain the truth about a reported pass in the second gap to the west of that peak. We should like to complete our map by exploring to their heads all the southern tributaries of East Creek, especially Deerhorn Creek. We should like to carry a few live trout from Bubb's Creek to plant in East Lake and Lake Reflection. And, more than all these, we should like to find ourselves with a fortnight to spare about the head-waters of Roaring River.

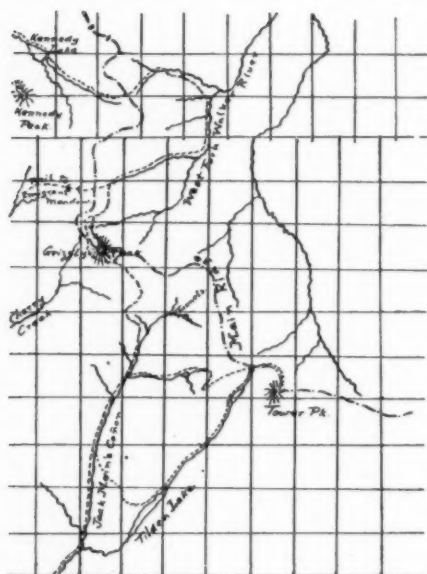
## A NEGLECTED REGION OF THE SIERRA.

BY LINCOLN HUTCHINSON.

One day in September, 1896, with two companions, I stood on the summit of Mt. Tallac. When, after enjoying the beauty of the nearer panorama, we turned our attention to the more distant features of the landscape, we found ourselves particularly attracted by the peaks of the main ridge of the Sierra, which stretched off to the south-eastward from where we stood. The nearer peaks were bare and uninviting, but at a distance of forty or fifty miles was a section where the mountains seemed to have gathered up their forces for a mighty display. A confused mass of jagged peaks, blue and white in the distance, seemed to be beckoning us on to many an Alpine adventure. We then and there promised ourselves that some day we would seek a nearer acquaintance with those peaks.

About a year later, in August, 1897, the same party of three pushed southward from Tallac into the region of the Blue Lakes. A short side trip from Kit Carson Pass took us to the summit of Round Top in Alpine County, and from that point we again had a most charming view of the section which had so attracted us a year before. We found ourselves much nearer to those jagged white and blue peaks, yet still too far away to hope for an intimate acquaintance at that time. Again we turned homeward, carrying with us a determination that some time in the near future we would make our way into the heart of that rugged region.





Main Ridge —————  
 Our trail - - - - -  
 Scale 2 miles to an inch.



Upon our return to San Francisco, we set to work to learn as much as possible about the section we had seen and the best way to get to it. We could find, however, but little information, save of the vaguest sort. As one member of the Sierra Club expressed it to us, that portion of the mountains seemed to be pretty nearly *terra incognita* so far as the Club was concerned. Lieut. McClure's article on the cañons to the north of the Tuolumne River, in one of the Club BULLETINS, gave us the nearest approach to definite information which we were able to find. Unfortunately, however, his explorations did not carry him quite as far north as we wished to go.

As to maps we were more fortunate. Mr. J. N. Le Conte's map of a portion of the Sierra, published by the Club a few years ago, was of assistance to us as to the extreme southern edge of the section we wished to reach, but it, like Lieut. McClure's description of his explorations, did not reach far enough northward to give us all we wanted. But at the last moment, through the courtesy of the Secretary of the Club, we were enabled to get a photographic reproduction of the advance copy of the Dardanelles sheet of the U. S. Geological Survey's map. This, we found, covered our region and gave us invaluable assistance in determining our route.

As a result of our various investigations, we determined to make Sonora our starting-point, to follow the old Sonora-Mono toll-road till we reached the higher mountains, and then to be governed as to our further movements by what we saw and learned of the country before us. The result was a trip as fine as anything the whole Sierra can offer, and it is with the hope that the attention of all mountain-lovers in California, and of members of the Sierra Club in particular, may be drawn towards a much

neglected region, that I attempt to give an outline of our doings.

Our party consisted of five: Messrs. M. R. Dempster, A. G. Eells, C. A. Noble, J. S. Hutchinson, Jr., and myself. We set out on foot from Sonora on the forenoon of June 5th last, with three jacks, a camping outfit, and provisions for about three weeks.

It is unnecessary to give in detail the reasons which led us to follow just the particular route we took. Suffice it to say that our primary object throughout was to find scenery, and that we governed our movements accordingly, climbing prominent peaks here and there, in order to get general views which would enable us to pick out the most promising routes. It is a wild, rugged, lonely region, and we had to plan each day's march with the utmost care, yet on the whole we encountered very few really serious difficulties. We followed the Sonora-Mono road to a point about seven or eight miles west of the summit of Sonora Pass, then turned off to the south-eastward up the East Fork of Relief Creek, and made our way by good trail to Kennedy Lake, at the western end of Kennedy Pass. Kennedy (J. F. Kennedy, of Knight's Ferry), by the way, claims some two or three thousand acres of land in that immediate region and may raise exasperating objections to parties passing over his trails. To avoid delay, it might be well for any one planning such a trip to communicate with him beforehand.

From Kennedy Lake we crossed the main ridge, over the pass, to the head-waters of the Walker River. Then, following up the West Fork of that river, we made our way southward, in a general direction, crossed high passes, and finally succeeded in getting to the head-waters of Fall River, which flows a little west of south, through Jack Main's Cañon, into Lake Vernon and Hetch Hetchy. This portion



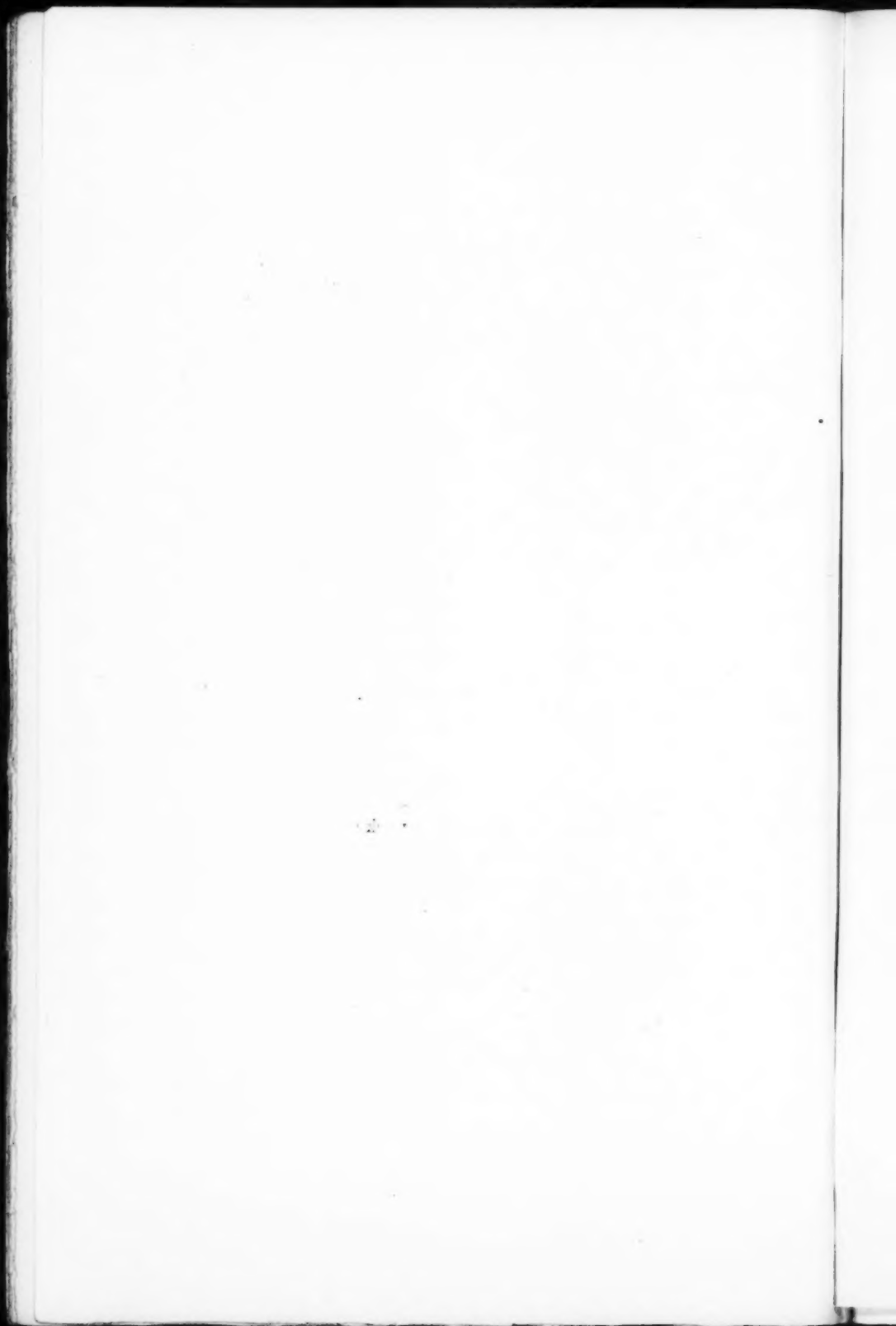
LOOKING SOUTH-EAST UP EAST FORK RELIEF CREEK TOWARD  
KENNEDY LAKE AND PASS.

From a photograph by Lincoln Hutchinson



KENNEDY'S UPPER MEADOW — NEAR KENNEDY LAKE.

From a photograph by Lincoln Hutchinson.



of our trip, from Kennedy Lake to the upper end of Jack Main's Cañon, was the only serious part, and it may be worth while to give our route somewhat in detail. In some places we were able to make use of existing trails, but often they were poorly marked, and it was only by constant reference to map and compass that we could follow them. Wherever practicable we improved the monumenting as we passed along. Over a considerable distance we were our own pioneers and here also, so far as time permitted us, we marked our route with monuments. Our exact course can best be shown by means of the accompanying sketch. By using this, in connection with the Dardanelles sheet (now published) of the map of the Geological Survey, future parties should be able to avoid any great delay or difficulty. It may be well to suggest a possible variation from our route. Instead of passing round Grizzly Peak over its western shoulder, it would probably be easier and shorter to go over its eastern shoulder. (This alternative route is indicated on the accompanying map thus: — - - - -.)

The greatest difficulty which threatened us was snow on the passes. We took our animals as high up as 10,200 feet, and if this had been a year of ordinary snowfall, we would certainly have found our way blocked at several points. As it was, we managed to get through by a process of dodging the worst places, and floundering through the others. Generally it would probably be best not to attempt the trip earlier than the last week of June or the first week of July.

Two short side trips are worthy of special mention. From a camp near the head of Jack Main's Cañon (a most beautiful cañon, by the way, and deserving of a more poetic name) two of our party made their way to the lake (known as Jack Main's Lake) in which Fall River has its rise. Close to the head of the cañon they found a curious natural phenomenon similar to one which Lieut. McClure

describes much lower down in the cañon—two tunnels, each two or three hundred feet in length, into which the river disappears, and through which it makes its way. The walls of these tunnels were composed in part of a beautifully crystallized substance which we have since found to be dolomite.

The other side trip was from the same camp in Jack Main's Cañon to Tower Peak, the highest point within easy reach of our route. The jacks were left in camp in the care of one of the party, while the other four of us set out with sleeping-bags and two days' provisions on our backs. There were no serious difficulties in the climb, and the view from the summit was inspiringly grand. The peak is not high as Sierra peaks go (only 11,704 feet), yet the panorama from its summit covers the whole sweep of the Sierra from Tallac to Lyell and beyond, a wilderness of massive peaks and dazzling snow with dark furrows of forested cañon slanting across. And that trip also brought us the never-to-be-forgotten memory of a night spent far up on a barren, exposed, precipitous ridge 11,000 feet above the sea, in a weird world of snow and ice and rock, silent and cold as death itself, and with the stars so near and so brilliant that they seemed within reach of our finger-tips.

Upon our return to Jack Main's Cañon we set out at once on our journey back to Sonora. Our route presented no special difficulties, being, for the greater part, over well-marked trails. We followed down the Fall River trail to Lake Vernon, turned westward to Lake Eleanor, and then made our way, *via* Lord's, back to the Sonora-Mono road at a point known as Long Barn. A large part of this return route is already familiar to members of the Sierra Club.

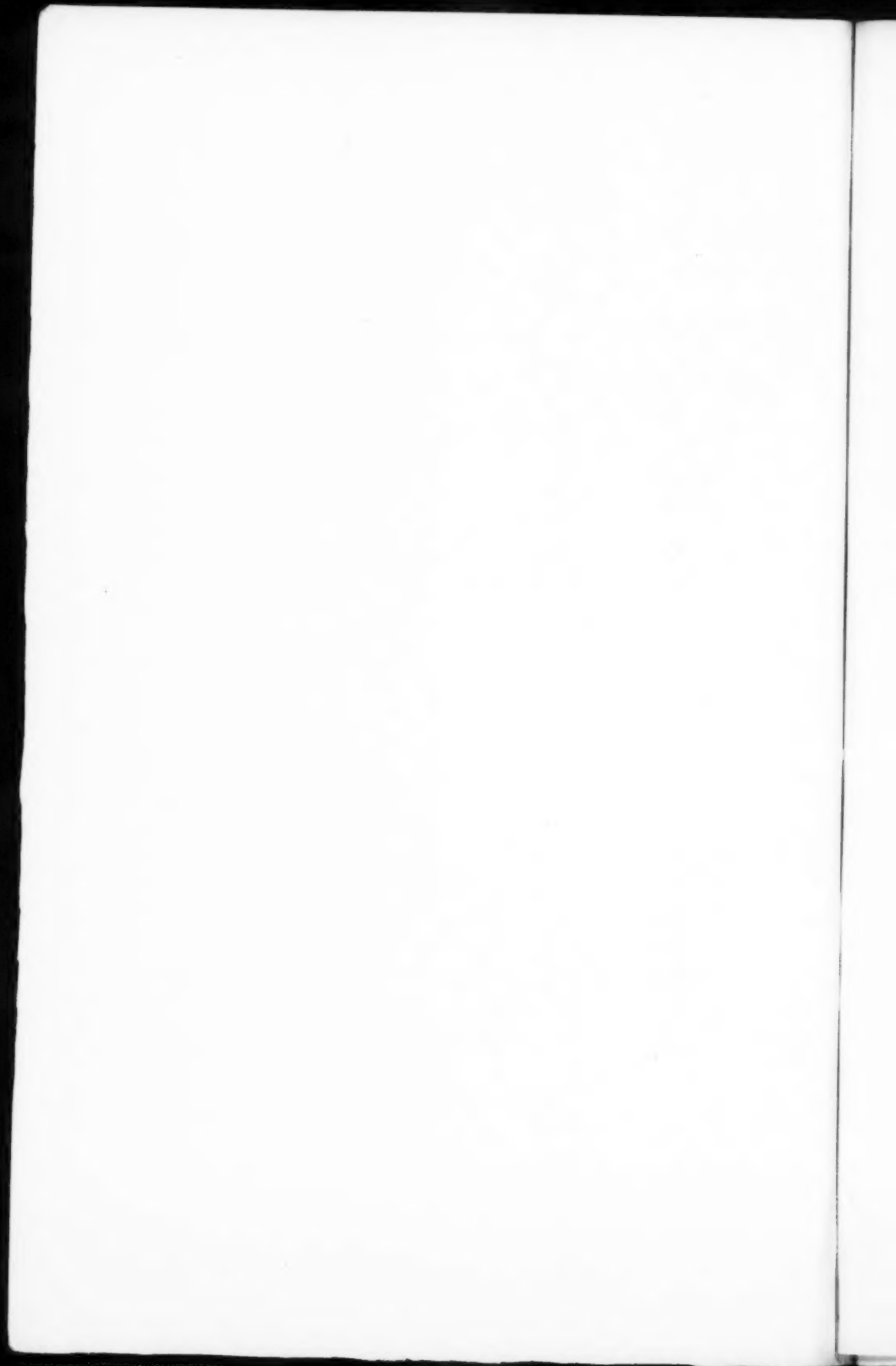
It has not been my purpose to give anything like a detailed account of our trip. As I stated at the outset, all



TOWER PEAK — FROM THE NORTH.  
From a photograph by Lincoln Hutchinson.



LAKE VERNON — FROM THE SOUTH-WEST.  
From a photograph by Lincoln Hutchinson.





that I have wished to do is to call attention to the fact that one of the finest sections of the Sierra is being neglected. Some faint idea of the nature of the country may perhaps be given by the accompanying photographs, chosen more or less at random from among the many we took during our trip. It must not be forgotten, however, that photographs can give but the vaguest impression of the real beauty and grandeur of our mountains. Color and perspective are such vital factors in all such scenes.

To persons at all accustomed to mountaineering this region is easily accessible, and it is to be hoped that others may turn their attention in that direction. If any members of the Club, or others, care for more details in regard to the trip, the members of our party will be glad at any time to give such information as we have.

NOTES AND CORRESPONDENCE.

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*In addition to longer articles suitable for the body of the magazine, the editor would be glad to receive brief memoranda of all noteworthy trips or explorations, together with brief comment and suggestion on any topics of general interest to the Club.*

*The office of the Sierra Club has been moved to Room 45, Merchants' Exchange Building, San Francisco, where all the maps, photographs and other records of the Club now are.*

*There are but a few copies on file of No. 3, Vol. I., of the BULLETIN. The Club would like to purchase additional copies of that number, and we hope any member having extra copies will send them to the Secretary.*

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As suggested by Mr. Le Conte in his article in the present number, the height of Tehipite Dome has been variously estimated. Probably the most accurate measurements are those made by Walter A. Starr and A. L. Chickering in 1896. Mr. Starr writes that his aneroid barometer gave 4,055 feet as the altitude of the valley at the foot of the Dome, and 8,505 feet at the top of the Dome, thus showing a mean altitude above the valley of 4,450 feet.

He noticed, however, strange action on the part of the aneroid about the Dome—an abnormal jump in going from the backbone of the ridge to the summit, and believes that this peculiar phenomenon may be responsible for the wide variation of the aneroid measurements heretofore made. By a rough application of triangulation from the valley below the Dome, he reached a result of 4,250 feet, and, judging from these figures, together with other considerations, Mr. Starr arrives at the conclusion that 4,300 feet is a fair approximation of the true altitude.

Mr. Winchell of Fresno, one of the earliest explorers of Tehipite, gives the height of the Dome as 5,200 feet, obtained by a triangulation with surveyors' instruments.

## NEW MAPS OF THE GEOLOGICAL SURVEY.

Since the last notice in the BULLETIN of the work of the U. S. Geological Survey in California, a number of new sheets have been published, notably the long-expected Yosemite and Dardanelles sheets. These two include between them one of the most interesting regions in the whole Sierra, from the head of the Mokelumne River on the north to Wawona on the south, and eastward far enough to include Little Yosemite, Mt. Hoffman, the Tuolumne Cañon, Tower Peak, and West Walker River.

The set of large-scale maps of the region about the Bay has been increased so that the list now comprises the following sheets: Karquinas, Mt. Diablo, Concord, San Francisco, Tamalpais, San Mateo, Palo Alto, San José, Mt. Hamilton.

There is a similar set of four maps of San Luis Obispo County — namely: Cayucos, San Luis Obispo, Port Harford, and Arroyo Grande; a set of twelve in the neighborhood of Los Angeles — Santa Monica, Pasadena, Pomona, Cucamonga, San Bernardino, Redondo, Downey, Anaheim, San Pedro, Las Bolsas, Santa Ana; and a detached group of three — Oceanside, Escondido, and El Cajon.

All these maps are sold at the uniform rate of five cents per sheet, retail, or at two cents per sheet for one hundred sheets or more, in one order. Prepayment is obligatory, and may be made by money-order, payable to the Director of the United States Geological Survey, or in cash — the exact amount. Checks and postage-stamps are not accepted. All correspondence should be addressed to THE DIRECTOR, U. S. GEOLOGICAL SURVEY, Washington, D. C.

C. B. BRADLEY.

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A REVISED MAP OF THE HIGH SIERRA.

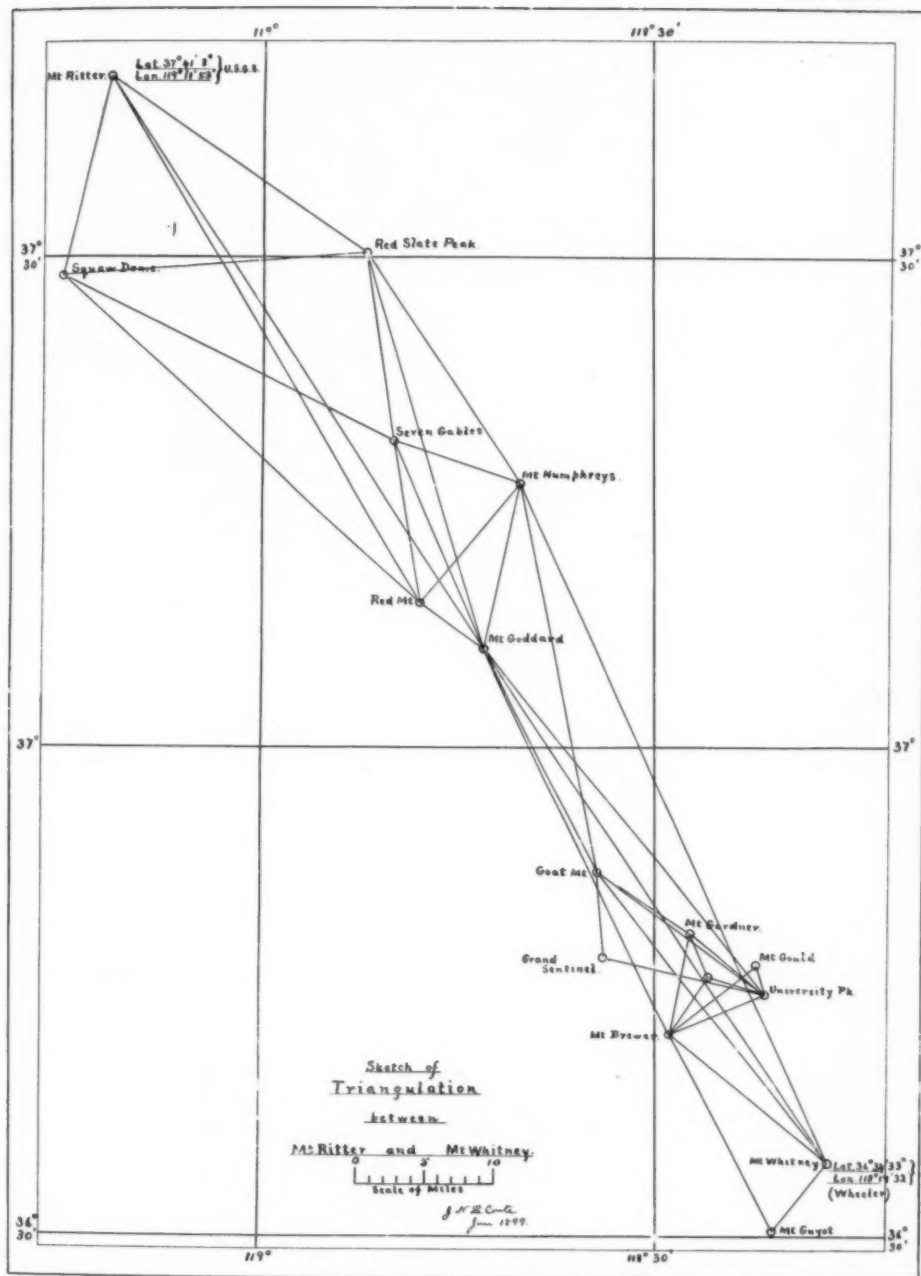
During the past summer, the writer and Mr. C. L. Cory succeeded in running a rough chain of triangulation, by means of a small plane-table, from Mt. Ritter along the crest to Mt. Goddard and Goat Mountain, thus connecting with the work previously done in 1895 and 1896 in the basin of Bubb's Creek and about Mt. Whitney. The accompanying sketch shows the relative positions of the principal peaks, all of which were occupied stations. From these fourteen stations nearly two hundred others were placed by intersections. The scale of the map was determined by the known positions of Mt. Ritter and Mt. Whitney — the first being given by the U. S. Geological Survey, and the last by Capt. Wheeler's Surveys West of the 100th Meridian. This material, besides a great

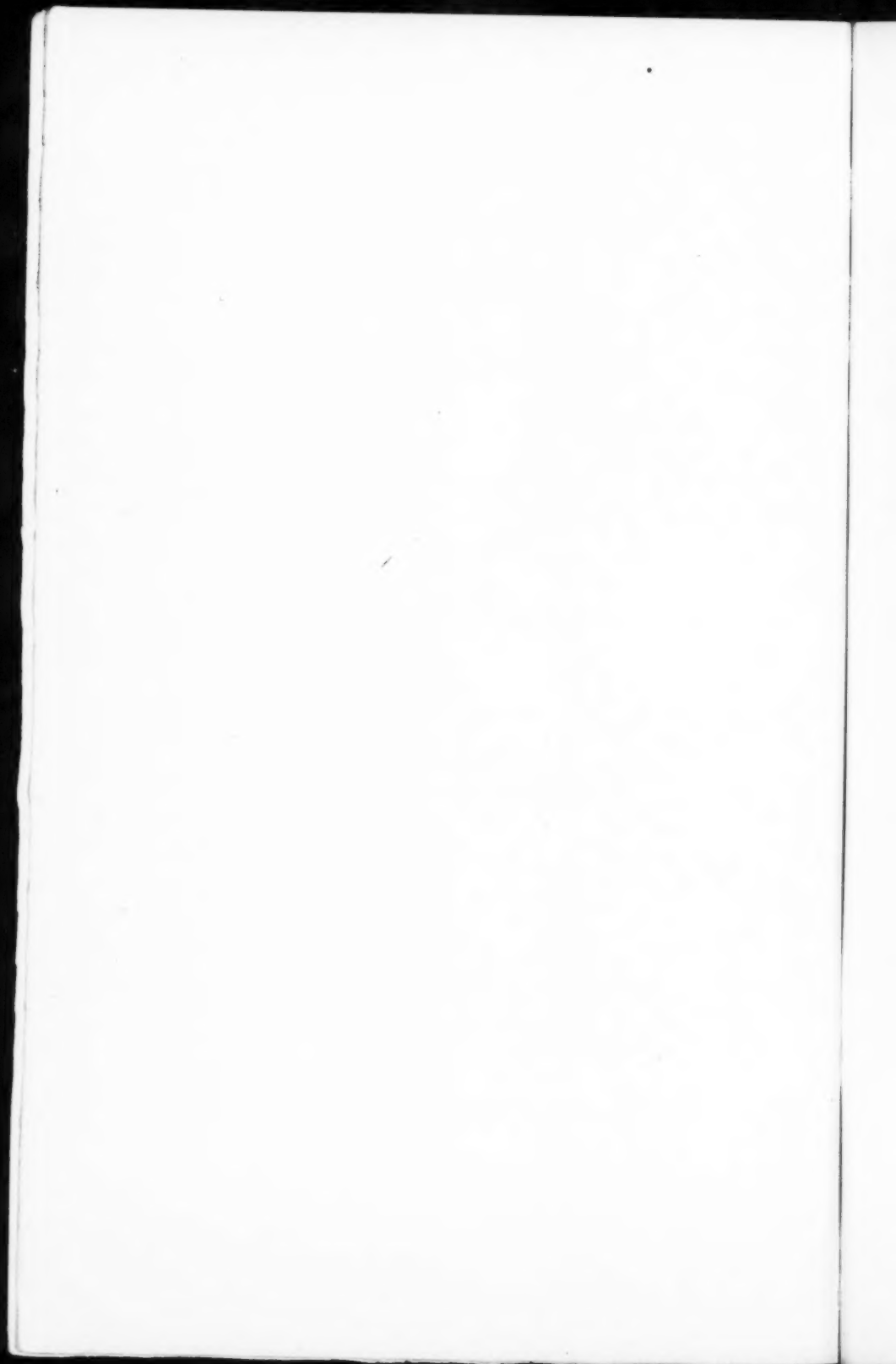
deal which has been accumulated by members of the Club during the past three years, I am now incorporating in a new edition of the Sierra Club Map. The map will be made in three sheets, and will be nearly double the scale of the old map of 1896. The northern sheet covers the region between lat.  $38^{\circ} 30'$  and lat.  $37^{\circ} 40'$ , and between long.  $120^{\circ} 30'$  and long.  $119^{\circ} 00'$ . This comprises most of the country drained by the Merced, Tuolumne, and Stanislaus Rivers. The second sheet covers from lat.  $37^{\circ} 50'$  to lat.  $36^{\circ} 57'$  and from long.  $119^{\circ} 46'$  to long.  $118^{\circ} 14'$ . This is the San Joaquin sheet, though portions of the Merced and King's River basins are within its boundaries. The southern sheet extends from lat.  $37^{\circ} 10'$  to lat.  $36^{\circ} 10'$  and from long.  $119^{\circ} 40'$  to long.  $118^{\circ} 00'$ , and is the King's-Kern sheet. The San Joaquin sheet is now complete, and it is hoped that the others will be ready before next summer. The Club will not be able to publish these maps at present, but blue-prints from the original tracings will be furnished to members at the cost of printing, which is fifty cents on paper and seventy-five cents on cloth, by addressing J. N. Le Conte, Berkeley, Cal.

The locations of the principal stations are as follows:—

<i>Name of Peak.</i>	<i>Latitude.</i>	<i>Longitude.</i>
<i>Mt. Ritter</i> . . .	$37^{\circ} 41' 8''$	$119^{\circ} 11' 50''$ [ <i>U. S. G. S.</i> ].
<i>Squaw Dome</i> . . .	$37^{\circ} 28' 50''$	$119^{\circ} 15' 45''$
<i>Red Slate Peak</i> . . .	$37^{\circ} 30' 20''$	$118^{\circ} 52' 00''$
<i>Seven Gables</i> . . .	$37^{\circ} 18' 30''$	$118^{\circ} 49' 55''$
<i>Mt. Humphreys</i> . . .	$37^{\circ} 16' 00''$	$118^{\circ} 40' 10''$
<i>Red Mountain</i> . . .	$37^{\circ} 9' 00''$	$118^{\circ} 48' 00''$
<i>Mt. Goddard</i> . . .	$37^{\circ} 6' 00''$	$118^{\circ} 43' 05''$
<i>Goat Mountain</i> . . .	$36^{\circ} 52' 00''$	$118^{\circ} 34' 30''$
<i>Mt. Gardner</i> . . .	$36^{\circ} 48' 15''$	$118^{\circ} 27' 40''$
<i>Grand Sentinel</i> . . .	$36^{\circ} 46' 50''$	$118^{\circ} 35' 00''$
<i>Mt. Gould</i> . . .	$36^{\circ} 46' 40''$	$118^{\circ} 22' 40''$
<i>Charlotte Peak</i> . . .	$36^{\circ} 46' 00''$	$118^{\circ} 26' 20''$
<i>University Peak</i> . . .	$36^{\circ} 44' 45''$	$118^{\circ} 21' 45''$
<i>Mt. Brewer</i> . . .	$36^{\circ} 42' 20''$	$118^{\circ} 29' 05''$
<i>Mt. Whitney</i> . . .	$36^{\circ} 34' 33''$	$118^{\circ} 17' 32''$ [ <i>Capt. Wheeler</i> ].
<i>Mt. Guyot</i> . . .	$36^{\circ} 30' 40''$	$118^{\circ} 21' 40''$

J. N. LE CONTE.





## PACK-ANIMALS, AND HOW TO PACK THEM.

In connection with the article entitled "A Neglected Region of the Sierra," printed in this number of the BULLETIN, the following notes may be of interest.

The party used packing-boxes constructed of the dimensions and in about the manner described by Mr. Howard Longley in the BULLETIN for January, 1897, except that instead of loops of rope passed through holes bored in the side of the box as there described, we slung our boxes by loops of leather fastened to the ends of the box. These loops were formed by cutting strips of the tough leather, called by the Mexican saddlers "latigo" leather, about an inch wide and sixteen inches long, and folding them with the ends together. A single screw and metal washer attached the loop thus formed to the end of the box at a point which brought the end of the loop just above the top of the box, and yet left it free to move backward and forward with the screw as the pivotal point. Loops of rope of the necessary length were passed through the leather and hung over the horns of the saddles.

In packing, we did not use the diamond hitch, but instead of it employed a hitch which is in common use among the Spanish packers in Southern California. For the kind of packs we had, and in such rough country as we passed through after leaving the Mono road until we reached Lake Vernon, it is, in the writer's opinion, much the better hitch. Although not difficult to tie, it is not easily described without the aid of diagrams; but the writer will take pleasure in explaining it fully to any reader who may desire to make use of it. In the foreground of the photograph of Kennedy's Upper Meadow one of our burros, with his pack on, is shown so plainly that it gives a very good idea of our method of packing.

The main purpose of this note, however, is to warn the inexperienced against placing too much reliance upon persons who may undertake to supply animals and packing equipments. All the pleasure of a summer's outing may thus be destroyed, even if no worse consequences follow. We had arranged to get three strong, reliable pack-animals, with complete rigs, at Sonora from Frank Hall, and to pay him \$12 for each animal and \$3 for each saddle, one-half of these amounts to be refunded to us on our returning the property in good condition. We arrived at Sonora about six P. M., expecting to find our animals and equipment ready, and to spend the long evening in adjusting things, so as to make an early start next morning. But Mr. Hall did not call at the hotel as we expected, and although we spent until eleven that night searching for him, we were unable to find him. When, none

too early next morning, we did find him at his house he showed us two of the smallest pack-jacks any of us had ever seen, and after difficult maneuvering to keep from being kicked, managed to corner and noose a third, a fractious, unmanageable brute, which we saw at once had never been used for packing, and refused to take. After another hour's delay, he secured from a neighbor a much larger and stronger animal, which, as we anticipated, proved to be the best of the three. One of the two little fellows began to limp the second day out.

But what most exasperated us was the makeshift saddles and junk-shop rigging which Mr. Hall provided for our use. The saddles were rudely made of soft pine, and the old paint showing in streaks led us to believe that even this material had already performed its more appropriate service as the prop and support of an aged, but honest, Sonora chicken-coop. The fittings certainly must have been part of the interior furniture thereof. Though with misgivings, we put them on our burros rather than be longer delayed. All of them required constant annoying readjustments and repairs, and one of them came to pieces one afternoon, as the result of its bearer lying down with his pack on, a frequent occurrence. Fortunately we were at the time near the old house at Baker's Station. Here we found some seasoned pine, and, with the aid of a hunting-knife having a good saw-blade and some copper wire which we had with us, we succeeded, whilst resting and sheltering ourselves from a passing afternoon thunderstorm, in making new front cross-pieces and so putting the thing together again that it was a better saddle than when we started. Almost every time we packed up we reminded each other that for \$5 apiece we could have gotten new ash saddles, well made and properly shaped with strong fittings, at a store on Market Street, in San Francisco, where we had priced them. This, in the slang phrase, "jarred us," and was provocative of profanity. Our state of mind when we were coolly charged \$2.50 extra for abrasions on the backs of the animals caused by the execrable things, can best be imagined. Moreover, we were told by other persons whom we met that we could have purchased outright plenty of well-trained pack-animals at \$7 and \$8 each in Sonora, if we had had the time and known where to look for them. It should be added that our outfitter did not appear to be an ill-natured or ill-disposed man, and that we know nothing against him except what is here set down. Doubtless, if he could have looked upon the matter in the light of modern business methods, knowing he had an organized body of patrons, whose wants it would pay to study and try to meet, he might have



proved a very acceptable caterer to such wants. As it was, we can hardly recommend him.

Our experience leads to the suggestion that the Sierra Club might easily be made the means of saving its members from such annoyance, impediment, and danger. The needful thing is to show an organized demand for the services of a painstaking outfitter at the two or three towns from which parties usually start out. If, for instance, those expecting to make a trip were to send to the headquarters of the club each spring a memorandum of their requirements, a committee could, with but little trouble, get some local agent (livery-stable man or other person) to give the matter his careful and business-like attention. Even if he took no pride in being, by special appointment, purveyor to her Majesty the Sierra Club, he would at least have the powerful incentive of profit. This would soon result in a business-like and adequate system. Especially so, if it could be supplemented by the personal efforts of any member of the Club, resident or temporarily present at the town in question. The mere privilege of storing from season to season pack-saddles and other equipment at some place in those towns, where it would be looked after by some one taking an interest in the Club's work, would be of great value. Even a simple registration at the office of the Club of the names of such outfitters as had been found satisfactory by parties dealing with them would be of great assistance to members contemplating that most satisfactory and profitable of summer recreations, a camping trip in the Sierras.

ALEX. G. EELLS.

## FORESTRY NOTES.

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Edited by Professor WILLIAM R. DUDLEY.

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The stirring military events of the past year have happily not retarded a healthful development of the forest-reservation policy in the United States. It will be remembered that Congress suspended in June, 1897, eleven of the thirteen forest reservations established by President Cleveland, February 22, 1897. In 1898, through the efforts of the House (although again in face of opposition from the Senate), under the leadership of Representatives Lacey and McRae, backed by the best part of the press of the country, and the very active efforts of the American Forestry Association, the above eleven reservations were re-established, and again became subject to the operation of our reservation law. The work of the U. S. Geological Survey on the reservations was also continued.

Californians were favored by President McKinley's first forest-reservation proclamation, when he established, March 2 and June 29, 1898, the *Pine Mountain and Zaca Lake Forest Reserve*, chiefly in the so-called Ventura Mountains, north and north-east of Los Angeles and Santa Barbara, and comprising 1,644,594 acres. This reserve was made at the request of the people of California, particularly by the people of that region. Very little mountain forest land remains unreserved in Southern California.

Last spring the San Francisco Board of Trade appealed to the U. S. Government to establish a forest reserve about Lassen Butte, and very recently the State Board of Trade has passed resolutions inviting various organizations, including the Sierra Club, to co-operate in securing action by the Legislature favorable to efficient policing of forests of California (presumably those owned by private parties, are referred to). It also favors the establishment of a chair of forestry at one of the large universities. It is interesting to note that this State, from the beginning, has never wavered in its support of the reservation movement, and we owe many thanks to our Senators and Representatives in Congress for their sympathy with it.

The people of Arizona and New Mexico have shown favor to

reservation policy, and the Territorial Legislature of Arizona has petitioned Congress to reserve all mountain and forest land valuable for the protection of water-supplies, particularly for irrigation. Consequently, on the 10th of last May, the President established by proclamation the *Prescott Forest Reserve* in Central Arizona; on the 17th of August, the *San Francisco Mountain Forest Reserve* and the *Black Mesa Forest Reserve*,—aggregating 2,544,480 acres. In New Mexico 120,000 acres have been added, by Executive proclamation, to the Pecos River Forest Reserve. All of these reservations are of the greatest importance to the agricultural lands lying below them. It is gratifying to those familiar with the arbitrary lines of the forest reserves, to learn that the Black Hills Forest Reserve (Dakota) has been modified by the exclusion of about 190,000 acres, and the addition of 433,440 acres. This was no doubt done in accordance with the recommendations of the U. S. Geological Survey.

At the present time there is said to be 43,597,714 acres in the U. S. Forest Reserves; and more, particularly in California, will soon be added.

The increase of intelligence in America during the past two years, concerning our forest resources and sound theories of forestry, has been almost marvelous. It is no doubt due to the conscientious work and the recommendations of the U. S. Forestry Commission, combined with the bold generalship of President Cleveland in proclaiming such a large amount of forest land as reserved, that it precipitated a struggle between the enemies and the friends of rational forestry. Every newspaper in the land felt bound to look up and discuss the merits of the question and the interests concerned.

Traceable to the interest developed by the proclamation of February 22, 1897, is possibly the establishment, in 1898, of the first university school of forestry in our country, that at Cornell University. It is called the "New York State College of Forestry," and Dr. B. E. Fernow has been made director, with Filibert Roth as assistant professor. A four years' course of study and practice is laid out; but the greatest interest centers around the use by the school of a portion of the Adirondack State Reserve as experimental ground for working out a practical system of American forestry.

Conversation last summer with several of the trustees of Cornell University developed the fact that Dr. Fernow had already aroused in their minds the greatest interest in the undertaking; and he begins his work supported by their thorough good-will and active co-operation.

Returning to the Pacific Coast, near the end of August, the writer went immediately into the Sierras for ten days, to observe the effects of the excessively dry season on familiar forests, and the practical solution of the much-discussed proposition,—“Shall stock be allowed to freely range the forest reserves and national parks in dry seasons on account of the scarcity of pasturage below?” The answer appeared positive against unrestricted range, or even the usual amount of pasturage. For the high meadows and mountain river flats primarily suffered this year from shortage in irrigation, on account of the light snowfall last winter, just as the valleys below suffered from the light rainfall. Secondly, they suffered to the absolute extinction (in many of them) of their perennial sod, from the hordes of animals which ranged and raged over them all summer long. They were unrestrained by the faithful cavalry of the U. S. regular army, who had “gone to Manila,” leaving the parks to their enemies during the year they needed protection most. It is impossible to enter into great detail. But the region was one I had visited before, after a season of plentiful rainfall, and high grass was abundant in the meadows all along the divide between the Kern River and the streams flowing westward. The bands of sheep were not then so numerous as to be forced from scarce pasturage elsewhere to attack the wet meadows. This year it was estimated that 200,000 sheep had swarmed over the divide through the Tule River region alone. From Nelson’s ranch—5,500 feet—I made four excursions to points mostly over 10,000 feet, one about 12,000 elevation. This should be the trackless forest, “where foot of man hath ne’er or rarely been,” but I found no space that had not been harrowed to dust by alien hoofs; the most difficult benches had been scaled, every plant or succulent leaf within reach had been devoured, and every meadow, wet or dry, gnawed to the quick. Not only sheep, but horses, milch cows, and even pigs, were frequently seen in the forests and on the meadows above 10,000 feet elevation. No one who has seen pasturing in a dry season, even in the most thickly-settled portions of the globe, can imagine the destruction these creatures had wrought in these, the wilds and fastnesses of our continent. Nelson and others reckoned that three-fourths of the “deer-brush”—a bush valuable for deer and browsing animals—had been destroyed, and that the White Meadows, a large series about the head of Nelson’s Fork of the Tule River, had been ruined, meaning that they would grow moss instead of grass the next rainy year. Half a dozen forest fires were raging in sight, as one stood on Jordan’s Peak, above the old Jordan Trail, the 5th of September.

Probably most of this destruction had been worked by the nomadic Portuguese and Frenchmen, who have no holdings in the mountains, and but few acres, if any at all, in the San Joaquin Valley. These men hurried into the mountains early the present year (1898); and when men who owned or had legitimately rented mountain meadows arrived later, they found their feed devoured, and sometimes the marauders holding the conquered territory with shot-guns.

There were a few forest "rangers"—1898 vintage—occasionally visible in September. Most of these men had been appointed by agents of the Interior Department, apparently for other reasons than their fitness. One was afraid of his horse; another was a village carpenter from the San Joaquin Valley, a good man, who had never been in the Sierras before; another never discovered any forest fires, excepting those near his own cabin, and these appeared to be mostly in his imagination. Earlier in the season these men had attempted to control the invading sheep-herders, but they did not arrive in the mountains until after the herders, when the latter ignored them with shot-guns; they therefore subsided into fire-extinguishers. Later, when the forest fires became more serious, men who knew the mountain trails, who knew and loved the mountains and could intelligently combat the fires, were taken on. Such men, to be had anywhere along the Sierras, are the men to form into the rank and file of a forestry service, and would be as clever in their place as the American soldier is in his.

Visiting the Sierras for four successive seasons has brought increasing conviction on one point: Our coming forestry service must be allied to the War Department or the Geological Survey, or some bureau similarly organized on the merit system of appointment, if it is to obtain respect from the public, or even from Congressmen. Our much-railed-at Congressmen, with all their faults, have not been slow to recognize and respect merit in scientific bureaus, when distinguished men were directors. Joseph Henry and Spencer F. Baird were generously supported. And it is a fact, perhaps scarcely known, that during the contest over the Cleveland reservations, compromise was finally effected, because the "Western Congressmen" were willing to yield their opposition if the whole matter of the reservations could be turned over to the Geological Survey to examine and report upon. This is something for the American Forestry Association to think on. The formation and guardianship of the forestry service is of vital importance. If it is a scientific bureau from top to bottom at the beginning, with an able director, Congress is likely to deal honorably with it ever afterward.



